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Bacterial Bronchitis Frequent in Children With Chronic Wet Cough

Clinical Context

According to the current study by Zgherea and colleagues, chronic wet cough, defined as a wet cough that lasts for 4 weeks or more, is easily recognized by parents and pediatricians. Also, it is a major debilitating finding in children with pulmonary disorders such as cystic fibrosis or ciliary dyskinesia and immunodeficiency disorders. However, the diagnosis of chronic bronchitis is not easily accepted in pediatric practice as in adult practice, and it is uncertain what the prevalence of purulent and nonpurulent bronchitis is among children with wet cough.

This retrospective study determines the frequency of bacterial infections among children with wet cough, using medical charts and bronchoscopic findings.

Study Synopsis and Perspective

Purulent bronchitis is common among children with chronic wet cough, according to a retrospective study published online January 9, 2012, in Pediatrics.

In addition, 56% of the children in the study, all of whom had been referred to a pediatric pulmonary clinic because of an intractable wet cough, had bacterial infections of the lower airway. The investigators, led by Daniela Zgherea, MD, from the Department of Pediatrics, Maimonides Infants and Children's Hospital, Brooklyn, New York, also found that tracheomalacia was identified on bronchoscopy far more frequently in the 0- to 3-year-old children in their study (30.3%) than in the general pediatric population.

The authors raise the need to better understand the etiology and best treatments for these lingering coughs (lasting 4 weeks or more).

"The diagnosis of 'chronic bacterial bronchitis' is not readily accepted in the pediatric population, however, as many physicians assume that is an 'adult' respiratory illness associated with tobacco smoking," the authors write.

In the study, investigators reviewed the charts and bronchoscopy findings of 197 children referred by their primary care physician to a pediatric pulmonary clinic at Maimonides Infants and Children's Hospital because of a persistent chronic wet cough. More than half of the study patients (55%) were aged 0 to 3 years, 36% were aged 3 to 7 years, and 9% were older than 7 years of age.

One third of the children in the youngest group had bronchoscopy-confirmed laryngomalacia or tracheomalacia. However, the frequency of laryngomalacia and tracheomalacia did not appear to be associated with purulent or nonpurulent bronchitis.

Bacterial cultures were positive in 91 children (46%). Of these, nontypable Haemophilus influenzae accounted for nearly half (49%) of the positive cultures, Streptococcus pneumoniae accounted for 20%, Moraxella catarrhalis accounted for 17%, and Staphylococcus aureus accounted for 12%.

Bacterial infections were more frequently associated with purulent bronchitis (84%) than with nonpurulent bronchitis (16%; P < .001). Regarding the 16% of children with purulent bronchitis who had negative cultures, the authors hypothesize these may be false-negatives, in part resulting from the timing of sputum collection relative to antibiotics use.

"The presence of a relatively large group of children with nonpurulent bronchitis and negative bacterial cultures among our study patients may point out the existing connection between chronic wet cough and asthma, which is also suggested by findings of [bronchoalveolar lavage] eosinophilia seen in some children in our study," the authors write.

However, the study was unable to determine whether asthma contributed to the persistent cough. They recommend further prospective studies of the relationship between chronic wet cough, bacterial infections, and asthma in children.

The authors have disclosed no relevant financial relationships.

Pediatrics. Published online January 9, 2012. Abstract

STUDY HIGHLIGHTS

- 1. The investigators reviewed medical records and charts of 260 children presenting with chronic wet cough, with bronchoscopy reports for 2004 to 2008.
- 2. The children had been referred by their primary care pediatrician to a pediatric pulmonary clinic at Maimonides Infants and Children's Hospital.
- 3. The primary indication for bronchoscopy was an intractable cough that did not respond to conventional therapy with antibiotics and corticosteroids.

- 4. Other indications included suspected foreign-body aspiration and wheezing unresponsive to bronchodilators.
- 5. All patients underwent flexible bronchoscopy with bronchoalveolar lavage collection.
- 6. Procedures were videotaped.
- 7. Laryngomalacia was diagnosed in the presence of inspiratory stridor and was defined as an inward collapse of the supraglottic structures of the glottis on inspiration.
- 8. Tracheomalacia was defined as a collapse of at least 50% of the tracheal lumen during expiration.
- 9. Purulent bronchitis was diagnosed in children with visual evidence of purulent (thick green) bronchial secretions of grade 5 or 6 on Chang and colleagues' bronchoscopic scoring system.
- 10. Nonpurulent bronchitis was diagnosed in children who had visual evidence of nonpurulent bronchial secretions and a bronchoscopic score of 3 or higher.
- 11. A Papanicolaou staining technique was used to process bronchoalveolar lavage fluid.
- 12. A total of 197 children were included in the study, with 55% aged 0 to 3 years, 36% aged 3 to 7 years, and 9% older than 7 years.
- 13. 64% of children were boys.
- 14. Diagnostic bronchoscopy revealed purulent bronchitis in 56% of children and nonpurulent bronchitis in 44%.
- 15. Among children 0 to 3 years old, 30.3% had laryngomalacia or tracheomalacia.
- 16. Laryngomalacia was seen in 20.3% of children 0 to 3 years old with purulent bronchitis and in 11.1% of children with nonpurulent bronchitis.
- 17. Tracheomalacia was seen in 14.1% of children 0 to 3 years old with purulent bronchitis and in 13.3% of children with nonpurulent bronchitis.
- 18. Positive results on bacterial cultures were detected in 46% of children.
- 19. Among children with positive results on bacterial cultures, the most common pathogens were H influenzae (49%) followed by S pneumoniae (20%), M catarrhalis (17%), and S aureus (12%).
- 20. Positive results on bacterial cultures were found in 84% of children with purulent bronchitis and in 16% of children with nonpurulent bronchitis.
- 21. Severe neutrophilia found on bronchoalveolar lavage, defined as more than 35% of neutrophils, was found in 91% of children with purulent bronchitis and in 45% of children with nonpurulent bronchitis.
- 22. There was no difference between nonpurulent and purulent bronchitis, in the frequency of bronchoalveolar lavage eosinophilia.
- 23. The authors concluded that purulent bronchitis was present in 56% of children presenting with chronic wet cough and that chronic wet cough was associated with

lower respiratory tract infection. They also noted that purulent bronchitis vs nonpurulent bronchitis was more frequently associated with bacterial infection.

Clinical Implications

- Purulent bronchitis is present in 56% of children with chronic wet cough. The most common organisms are H influenzae and S pneumoniae.
- Purulent bronchitis vs nonpurulent bronchitis is more likely to be associated with bacterial infection.